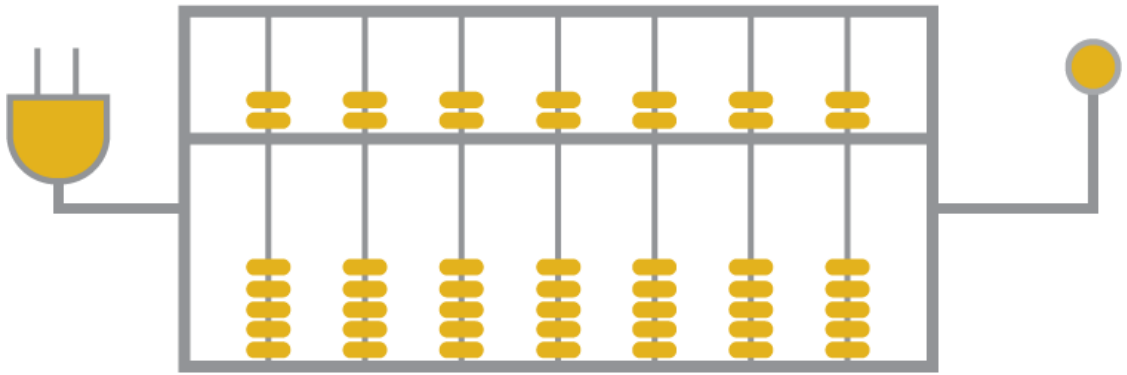
ABACUS



The student coding group for *everyone*

Welcome!

Goals for Today

- Choosing coding environments
- Terminal
- Anaconda Navigator
- Preview applications

Coding

- Coding makes science *easier*.
- Codes are written in “languages” like python and R.
- Mac: Terminal is found in Applications>Utilities
- PCs use a terminal emulator. Try “MobaXterm” https://mobaxterm.mobatek.net/download.html

Command line control

- Terminal (or emulators) is a window where the user can command the computer to execute tasks.

- “Bash” is the Unix-code “shell” that allows the computer to interpret your commands, line by line.

- UNIX was a common operating system from the 60s/70s developed to control the computer components.

UNIX: “Everything is a file”

- GNU/Linux was an open-source project pioneered by Richard Stallman and Linus Torvald. Commands are highly similar.
- **“cd”** : Change directory
- **“ls”** : List files in a directory
- **”touch filename”** : Make a blank file called ”filename”
- https://www.guru99.com/must-know-linux-commands.html

So…What is Python?

- Python is a scripting language that can solve math equations, read files, analyze data, etc.

- The diversity of applications is enabled by the plethora of available modules and packages.

- In upcoming sessions we will use packages like “**pandas”, “numpy”, and “ggplot”**.

Python will help you with science!

- Your computer can perform tasks faster than you can if you give it the right instructions with a Python script.
- Python has a semantic structure that is easy to understand.
- Any user on any machine can perform the same task and make alterations to suit a similar purpose.

Running Python scripts with Terminal

- A python script must be saved as “filename.py”
- Try the following sequence within a local directory to run your first python script. (**ls** shows contents, **cd** to move, Tab to autocomplete)

touch myfirstscript.py

vi myfirstscript.py

This opens the text editor within terminal. Type “i” to edit

#!/usr/bin/env python

print(”Hello World!")

The shebang term tells your computer to read python. Press ESC followed by “:wq” to save and exit.

python ./myfirstscript.py

What is a Jupyter Notebook?

- Typing English sentences into a word processor is a way to record and communicate instructions.

- Where do we type in our Python instructions?

- A Jupyter Notebooks is a workspace that you can type in the Python or R coding languages with added functionality to organize, run, and share scripts.

https://www.anaconda.com/

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Why am I downloading Anaconda?

- Data Science platform
  - Simple and keeps us all on the same page
  - Don’t reinvent the wheel

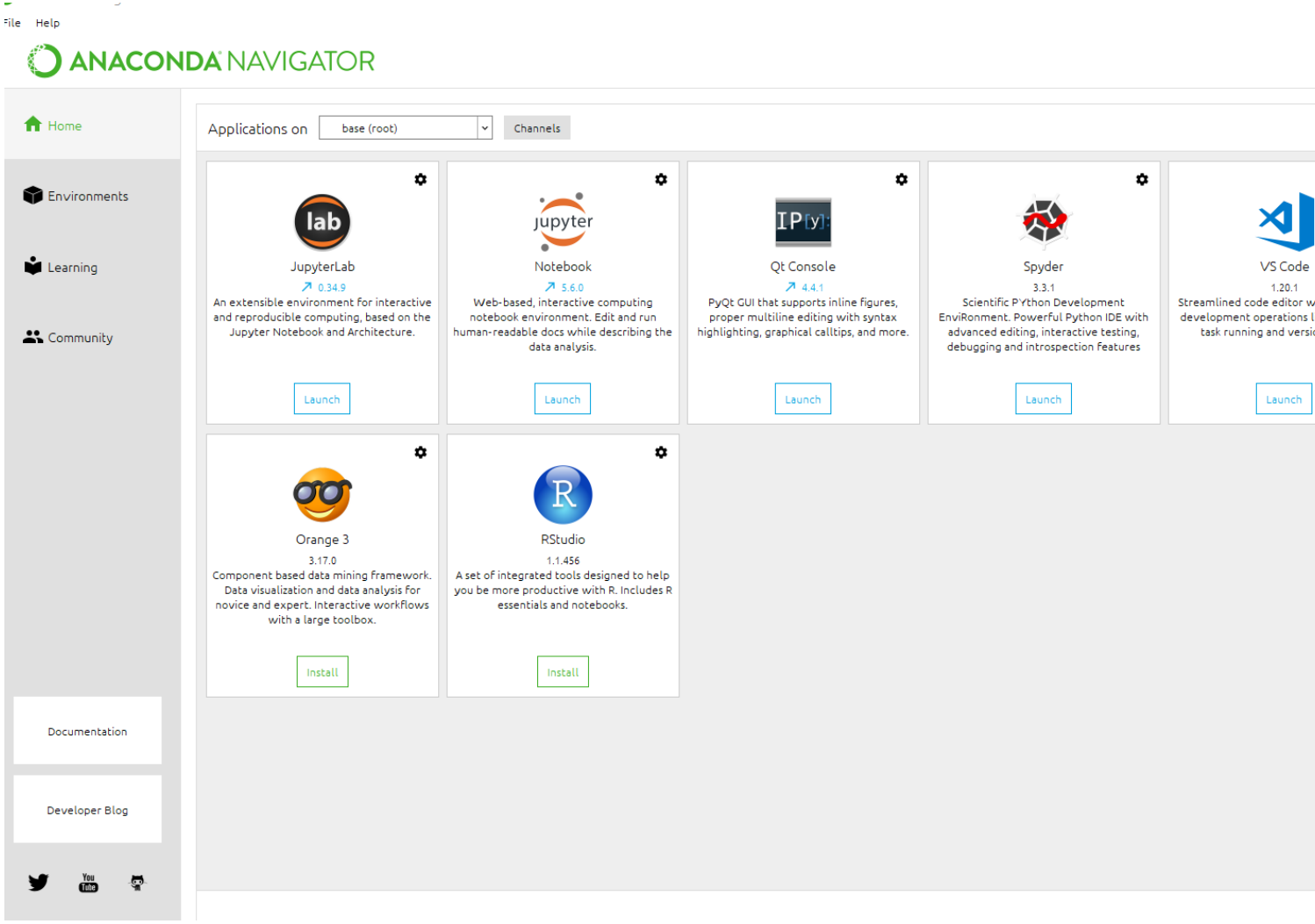
- Anaconda Survey
  - 26% students, 16% data scientists, 15% academics, 15% software developers
  - 2-2.5 million downloads per month
  - Most popular python distribution with a growing R following

Why am I downloading Anaconda?

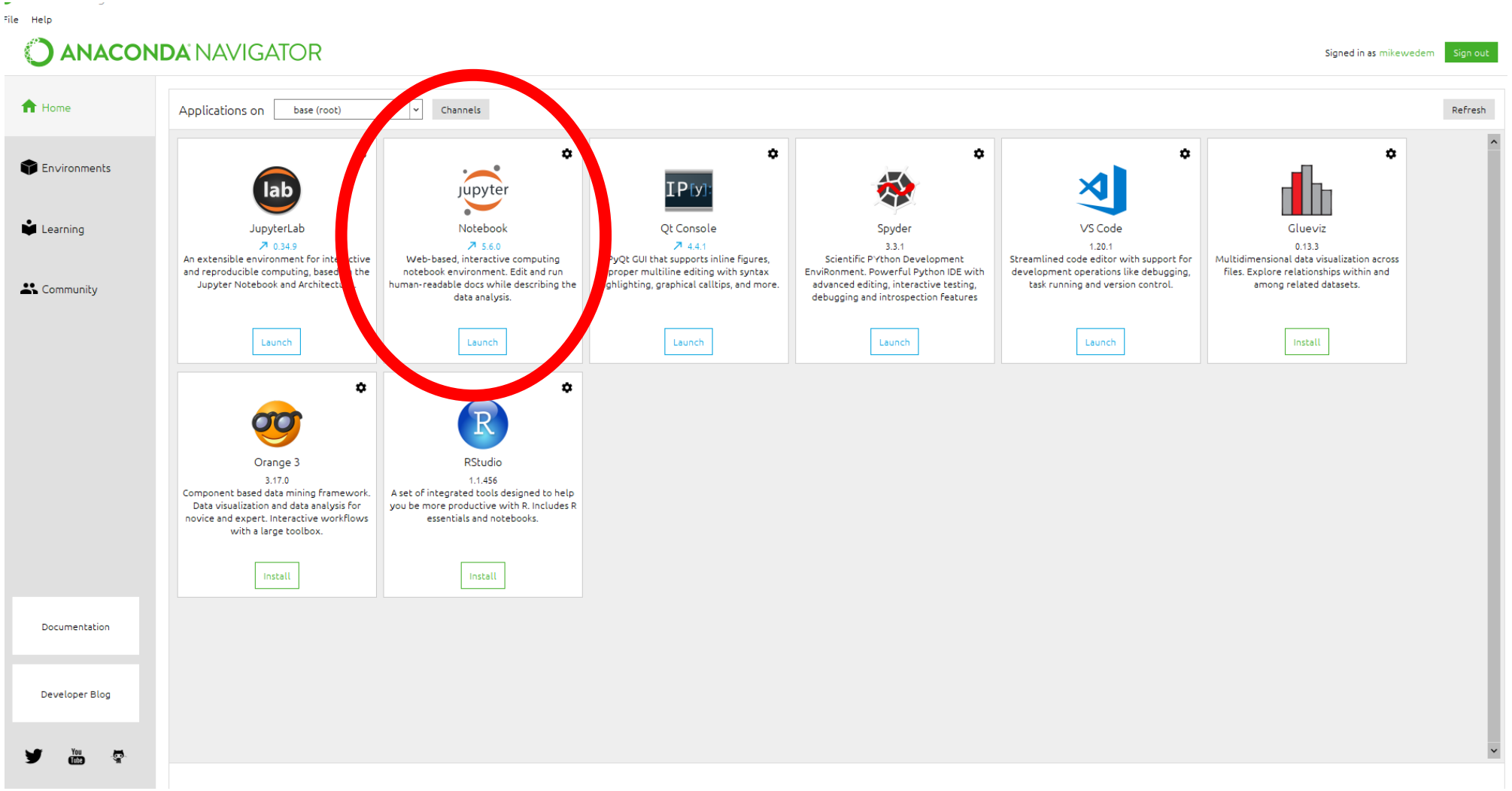
- **Python**
  - The main coding language
- **Libraries and packages**
  - The premade sets of code for a specific purpose
- **Package manager**
  - Organize and download new libraries
    - Numpy – arrays/matricies
    - Scipy - math
- **Environment Manager**
  - Really important!
  - Don’t mess up your computer python, make a new environment
  - Some old scripts need specific versions of python/packages
  - Can share your environment so it works on other computers

Anaconda Navigator

- Home
  - Your applications
- Environments
  - Manage working space and versions of software
- Learning
  - Lots of documentation and training
- Community
  - Ask questions on a public forum



Jupyter Notebook

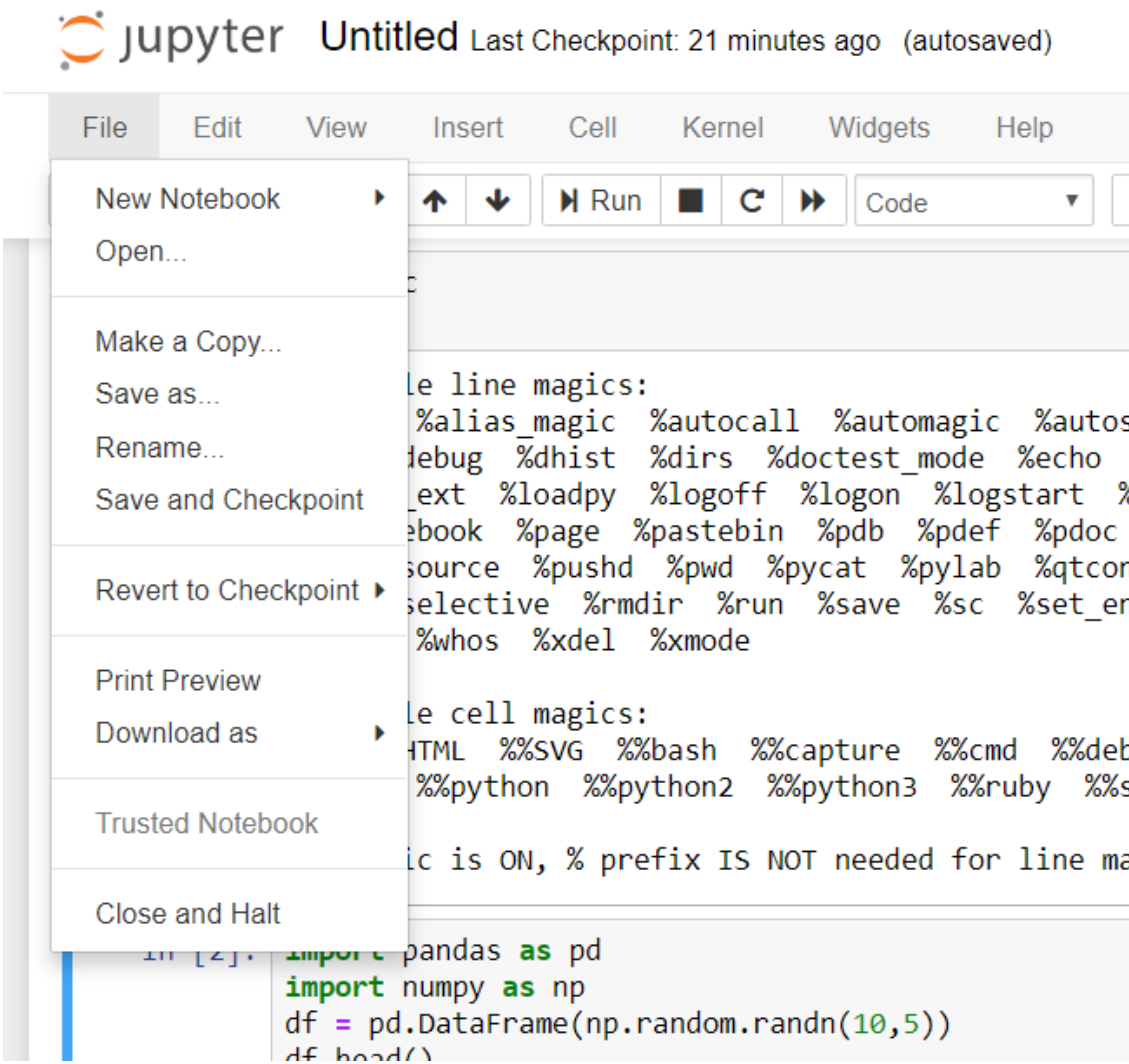


Jupyter Notebook

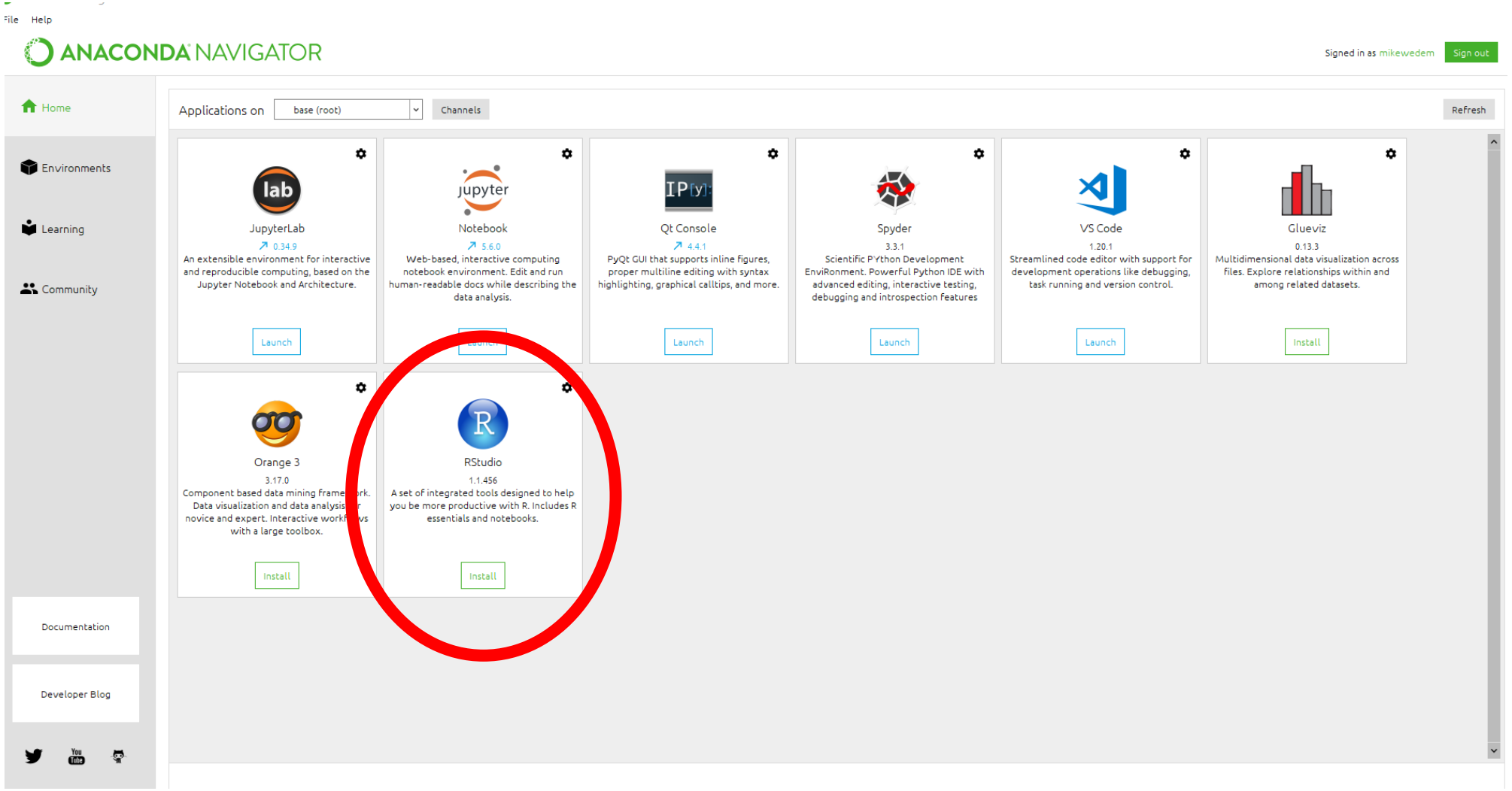
- Interactive Computing notebook, like a lab notebook for code
  - Can easily and quickly run multiple coding languages, including python
  - Can mix in regular text to describe what is going on ('Markdown')
- Not static visualization, but a living document
  - Charts/graphs/figures generated directly from the code
  - Can change the code and redo the figure or rerun the analysis

Download as …

- HTML
  - Permanent and static, not editable
- Ipynb
  - To share notebook
  - Editable and runnable



RStudio


File Help
ANACONDA NAVIGATOR
Signed in as mikewedem
Sign out
Home
Environments
Learning
Community
Documentation
Developer Blog
Applications on
base (root)
Channels
Refresh
JupyterLab
0.34.9
An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.
Launch
Notebook
5.6.0
Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.
Launch
Qt Console
4.4.1
PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.
Launch
Spyder
3.3.1
Scientific PYthon Development EnviRonment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features
Launch
VS Code
1.20.1
Streamlined code editor with support for development operations like debugging, task running and version control.
Launch
Glueviz
0.13.3
Multidimensional data visualization across files. Explore relationships within and among related datasets.
Install
Orange 3
3.17.0
Component based data mining frame ork. Data visualization and data analysis or novice and expert. Interactive work ws with a large toolbox.
Install
RStudio
1.1.456
A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks.
Install

RStudio

- Specialized language for statistical analysis, data processing, and representation
- Replace Microsoft Excel
- Use an R code to quickly, reliably, and reproducibly process raw data.
- Tidyverse Next Week!